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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,920	12/07/2004	Goetz-Peter Schindler	53721	8722

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EXAMINER

TESKIN, FRED M

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/516,920

Applicant(s)

SCHINDLER ET AL.

Examiner

Fred M. Teskin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 120704.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

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The preliminary amendment of December 7, 2004, has been entered in full.

Claims 1-5 are currently pending and under examination.

The disclosure is objected to because of the following informalities:

(i) a brief description of the drawing has not been provided as required by 37 CFR 1. 74; and (ii) at page 18, line 1, "isomerization" should read –isomerized–.

Appropriate correction of the specification is required.

Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 (and claims dependent thereon) is unclear and confusing in the recitation "stream comprising butadiene, ... and stream," (see, subparag. (C)). Presumably, the second occurrence of "stream" should read -steam- (*cf.*, specification page 2, line 23). Clarification and appropriate correction are required.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by US 3161670 to Adams et al.

Adams et al describe a multi-stage process for preparing butadienes from butanes including first stage catalytic dehydrogenation of butanes to butylenes (i.e., butenes) combined directly with stage two catalytic *oxidative dehydrogenation* of butylenes to butadienes (col. 2, lines 1-6). Application of the process to technically pure n-butane feed is outlined in column 3, lines 27 *et seq.* There it is stated that the feed is preferably free of oxygen and the catalytic dehydrogenation is selective to production of butylenes and small amounts of butadiene in the first reaction zone. In addition to butylenes and butadiene, analysis of the first-stage effluent indicates the presence of unreacted butane along with hydrogen and other secondary components (*id.*, lines 55-60). The presence of hydrogen in the effluent and the absence of oxygen in the feed indicate a *non-oxidative* dehydrogenation of n-butane to butylenes in the first stage reaction zone, per step (B) of the claimed invention.

As further detailed in Adams et al, the first-stage effluent enters reactor B of the second stage reaction zone, to which air or oxygen-containing gas is admitted and wherein the reaction mixture may advantageously include added steam (col. 3, line 61 to col. 4, line 2). Second stage conversion of butylene to butadiene of at least 60 % (preferably 75 to 95 %) is reported (col. 5, lines 11-18). The incomplete conversion means the second stage effluent will contain unreacted n-butane, butadiene and added steam, as per step (C) of the claimed invention.

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Adams et al then describe the operations of withdrawing the products, diluents and unreacted feed materials from reactor B and transporting the same to a separation zone wherein butadiene product is separated and sent to storage (col. 5, lines 24+). These operations are seen to correspond to step (D) of the claimed invention, i.e., recovering butadiene from the second product gas stream.

As such, Adams et al is seen to describe a process for preparing butadiene from n-butane, which includes all the steps requisite to applicants' invention as defined in claim 1. Claim 1 is therefore deemed to lack novelty.

The prior art made of record and not relied upon is considered pertinent to applicants' disclosure.

Boatright, Jr., et al is pertinent to the two-stage catalytic dehydrogenation of butane (note page 3, lines 20+ of left-hand column).

Lo et al is pertinent to the combination of a first zone dehydrogenation catalyst and a second zone reducible (oxidation) catalyst for effecting dehydrogenation of hydrocarbons to form olefin and/or diolefins (note col. 2, lines 8+).

Arakawa et al is pertinent to a process for producing 1,3-butadiene from a C₄ - paraffins and C₄-olefins fraction, the process including a dehydrogenation or oxidative dehydrogenation step (note cols. 3-4, bridging parag.).

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Claims 2-5 are free of the prior art of record. The limitations added by said claims are deemed to render the process claimed herein distinguishable over the prior art documents located or identified by the examiner as of the date of this Office action.

Any inquiry concerning this communication should be directed to Examiner F. M. Teskin whose telephone number is (571) 272-1116. The examiner can normally be reached on Monday through Thursday from 7:00 AM - 4:30 PM, and can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

FMTeskin/06-22-05



FRED TESKIN
PRIMARY EXAMINER
1713